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UNITED STATES ARMY AVIATION BOARD
Fort Rucker, Alabama

ATBG-DT-AVN-2860

23 SEP 1960

SUBJECT: Project Nr AVN 2860, Evaluation of the Improved Passenger
Seat Arrangements for HU-1A and HU-1B Helicopters

TO: Commanding General
United States Continental Army Command
ATTN: ATDEV
Fort Monroe, Virginia

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1. AUTHORITY.

a. Directive. Letter, ATDEV-6 452/76 (10 Jul 59), Headquarters, USCONARC, 10 July 1959, subject: "Evaluation of Seven-Passenger Seat Kit for HU-1A and HU-1B Helicopters."

b. Purpose. To conduct an evaluation of the seven-passenger seat kit to determine the optimum seating arrangement for the maximum number of combat troops that can be transported in the HU-1A and HU-1B Helicopters. ^{COULD}

2. DESCRIPTION OF MATERIEL. The seat kit consists of the following components:

a. A removable adapter floor plate with the necessary attachment fittings.

b. A combination five-man metal troop seat and litter rack with the necessary supporting structure and fittings.

c. Three medical attendant seats. (These seats are identical with those currently installed in HU-1A Helicopters.)

3. SUMMARY OF TESTS. The seat kit was installed in an HU-1A Helicopter. Tests by the US Army Aviation Board were limited to a short period of time since the helicopter was required for the HU-1B retrofit program and no substitute helicopter was available. Seven- and eight-passenger seating arrangements were evaluated to determine the optimum seating arrangement. Physical and operational characteristics were determined; however, neither flight characteristics of the helicopter with the different seating arrangements nor personnel and maintenance requirements could be determined in the time that was available for the test.

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a. Physical Characteristics.

(1) Installation of the HU-1A seat kit was difficult, and the installation instructions were inadequate. Conversion of the seating arrangement into the litter configuration was hampered by the difficulty in inserting and removing the hinge-pin which extended the length of the combination five-man troop seat and attached the seat to the after bulkhead.

(2) The five-man troop seat was unlike the standard Army variable-width troop seat in that a metal seat bottom was provided. The metal seat could not be stowed as easily as the standard fabric seat.

(3) Installation of this seat kit (without medical attendant seats) in the HU-1A Helicopter added approximately 100 pounds to helicopter empty weight, thereby decreasing the payload by a like amount. In addition, center-of-gravity limitations required the addition of tail ballast when more than six passengers were carried.

b. Operational Characteristics.

(1) Combat-equipped troops were loaded and unloaded with the five-man troop seat installed and the medical attendant seats in the following configurations:

(a) Three medical attendant seats facing forward -
When the three medical attendant seats were in the forward position, eight combat-equipped troops could be carried, but considerable difficulty was experienced getting into and out of the helicopter.

(b) Three medical attendant seats facing aft -
With the three medical attendant seats facing aft, eight combat-equipped troops could again be carried. Although the troops were somewhat cramped for space, entry and exit could be satisfactorily accomplished.

(c) Two medical attendant seats facing outward -
When seven troops were carried--five across the back and two facing outwards in medical attendant seats--the troops were permitted maximum comfort and ease of entry and exit.

(2) In all three configurations, individual weapons were placed upright between the knees of the troops while seated.

4. DISCUSSION.

a. Although the maximum seating capacity was obtained utilizing the eight-passenger configuration with three medical attendant seats facing

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aft, this arrangement was not as satisfactory as the seven-passenger arrangement because an extra medical attendant seat was required and troops were more crowded. Additionally, maximum comfort and ease of entry and exit were realized in the seven-passenger configuration with the medical attendant seats facing outward. However, aft-facing seats are more desirable for improved crashworthiness. The seats may be faced either aft or outward without modification to the seat or the floor securing points, thereby permitting a choice of seating arrangement.

b. The larger mast and improved center-of-gravity travel of the HU-1B will permit the installation of a high-density seating arrangement without the addition of ballast.

5. CONCLUSIONS.

a. The seven-passenger seat kit as tested is unsuitable for Army use.

b. Based solely on available space and weight-carrying capability of the helicopter, the best seating arrangement for the maximum number of troops is with the three medical attendant seats facing aft, which will accommodate eight passengers and permit satisfactory entrance and exit.

c. Center-of-gravity limitation and the required ballast for more than six passengers preclude consideration of a seven- or eight-passenger configuration for the HU-1A.

d. A seven-passenger configuration utilizing two medical attendant seats aft of the pilot, facing either aft or outward, and a 4-5 passenger variable-width troop seat across the after cabin bulkhead is considered the optimum seating arrangement for HU-1B Helicopters.

6. RECOMMENDATION. A seven-passenger seat configuration which permits two medical attendant seats to be faced aft or outward and which employs a standard 4-5 passenger variable-width troop seat be utilized in the HU-1B Helicopter.

7. COORDINATION. This report has been coordinated with the United States Army Aviation School.

Jack L. Marinelli

JACK L. MARINELLI
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